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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/739,351	12/19/2003	Toshiki Takahashi	246770US-2 CIP	1084
22850	7590	07/12/2007		
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER LUND, JEFFRIE ROBERT	
			ART UNIT 1763	PAPER NUMBER
			NOTIFICATION DATE 07/12/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/739,351	Applicant(s) TAKAHASHI ET AL.	
	Examiner Jeffrie R. Lund	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5,7,9,11-15,17,19 and 22-41 is/are pending in the application.
- 4a) Of the above claim(s) 1-3,5,7,9,11-15,17,19,22-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 29-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/21/06 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. The Examiner has reviewed the claim for priority and determined that the embodiment of the present invention was added in the present application. Therefore, the case will be examined based on the filing date of December 19, 2003 with a foreign priority date of December 19, 2002.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 29, 30, and 35 rejected under 35 U.S.C. 102(b) as being anticipated by Takagi et al, US Patent 6,402,847 B1.

Takagi et al teaches a plasma etching apparatus that includes: a plasma processing chamber 123; a susceptor 125 disposed in the processing chamber and on which a substrate W is mounted; an exhaust mechanism 131; and an exhaust ring 180. The exhaust ring has three types of exhaust holes 181, and each type of exhaust hole includes a plurality of exhaust holes that: are an annular shape to surround the susceptor; extend linearly; and are formed in concentric rows such that opening areas of the exhaust holes vary from one concentric row to another to increase from an innermost one of the concentric rows to an outer most one thereof. (Figures 11, 21 and 22)

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al, US Patent 6,402,847 B1, in view of Komiya et al, WO 01/48790.

Takagi et al was discussed above.

Takagi et al differs from the present invention in that Takagi et al does not teach that the thickness of the exhaust ring varies from the inner periphery to the outer periphery (concentrically) in degrees in accordance with the opening area of the exhaust holes.

Komiya et al teaches varying the thickness of the exhaust ring and size of the exhaust holes to control the flow of the exhaust gases through the exhaust ring. (Entire document, specifically, page 13 lines 8-16)

The motivation for varying the thickness of the exhaust ring concentrically in degrees in accordance with the opening area of the exhaust holes of Takagi et al is to optimize the flow through the different area exhaust holes by increasing the thickness of the exhaust ring as taught by Komiya et al.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the thickness of the exhaust ring of Takagi et al as taught by Komiya et al.

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6. Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al, US Patent 6,402,847 B1, in view of Ishii, JP 2001-093699, and Loewenhardt et al, US Patent 6,030,486.

Takagi et al was discussed above.

Takagi et al differ from the present invention in that Takagi et al does not teach a plurality of magnets arranged around the periphery of the exhaust ring.

Ishii teaches using a plurality of magnets equally spaced around the periphery of the exhaust ring such that the magnets act in the circumferential direction of the exhaust ring to prevent plasma leaking (abstract and figures).

Loewenhardt et al teaches the use of a plurality of magnets 60, 62 with an exhaust ring 96 to prevent the plasma from leaking through the exhaust ring (figures 6 and 7):

The motivation for adding magnets to the exhaust ring of Takagi et al is to prevent plasma from leaking through the exhaust ring as taught by Ishii and Loewenhardt et al.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add a plurality of magnets to the apparatus of Takagi et al as taught by Ishii and Loewenhardt et al.

7. Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al, US Patent 6,402,847 B1.

Takagi et al was discussed above.

Takagi et al differs from the present invention in that Takagi et al does not teach

that the holes have circular cross sections.

The motivation for making the holes of Takagi et al with a circular cross section is to optimize the shape of the holes. Furthermore, it has been held that a change in shape is a matter of choice which a person of ordinary skill in the art would have found obvious. (See *In re Dailey*, 357 F.2d 669,149 USPQ 47 (CCPA 1966) MPEP 2144.04.IV.B)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the cross section of the slots of Takagi et al circular.

8. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al, US Patent 6,402,847 B1, as applied to claims 36 and 37 above, and further in view of Komiya et al, WO 01/48790.

Takagi et al differs from the present invention in that Takagi et al does not teach that the thickness of the exhaust ring vary from the inner periphery to the outer periphery.

Komiya et al teaches varying the thickness of the exhaust ring and size of the exhaust holes to control the flow of the exhaust gases through the exhaust ring. (Entire document, specifically, page 13 lines 8-16)

The motivation for varying the thickness of the exhaust ring concentrically in degrees in accordance with the opening area of the exhaust holes of Takagi et al is to optimize the flow through the different area exhaust holes by increasing the thickness of the exhaust ring as taught by Komiya et al.

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the thickness of the exhaust ring of Takagi et al as taught by Komiya et al.

9. Claims 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al, US Patent 6,402,847 B1, as applied to claims 36 and 37 above, and further in view of Ishii, JP 2001-093699, and Loewenhardt et al, US Patent 6,030,486.

Takagi et al differ from the present invention in that Takagi et al does not teach a plurality of magnets arranged around the periphery of the exhaust ring.

Ishii teaches using a plurality of magnets around the periphery of the exhaust ring to prevent plasma leaking (abstract and figures).

Loewenhardt et al teaches the use of magnets 60, 62 with an exhaust ring 96 to prevent the plasma from leaking through the exhaust ring (figures 6 and 7).

The motivation for adding magnets to the exhaust ring of Takagi et al is to prevent plasma from leaking through the exhaust ring as taught by Ishii and Loewenhardt et al.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add a plurality of magnets to the apparatus of Takagi et al as taught by Ishii and Loewenhardt et al.

10. Claims 29, 30, 34-37 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogasawara et al, WO 02/39493, in view of Takagi et al, US Patent 6,402,847 B1.

Ogasawara et al teaches a plasma etching apparatus that includes: a plasma

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processing chamber 100; a susceptor 122 disposed in the processing chamber and on which a substrate W is mounted; an exhaust mechanism 154; and an exhaust ring 126. The exhaust ring has linear circular exhaust holes 126a having a constant diameter, and formed in 3 concentric rows. (Figures 1 and 2a)

Ogasawara et al differs from the present invention in that Ogasawara et al does not teach that opening areas of the exhaust holes vary from one concentric row to another to increase from an innermost one of the concentric rows to an outer most one thereof or the diameter of the largest exhaust holes.

Takagi et al teaches an exhaust ring 180 having a plurality of exhaust holes 181 that are formed in concentric rows such that opening areas of the exhaust holes vary from one concentric row to another to increase from an innermost one of the concentric rows to an outer most one thereof. (Figures 11, 21 and 22)

The motivation for increasing the size of the holes in the exhaust ring of Ogasawara et al from the inner most concentric row to the outer most concentric row is to optimize the flow of gases through the exhaust ring 181 as taught by Takagi et al.

The motivation for selecting a specific diameter of the largest exhaust holes is to optimize the flow of gas through the exhaust ring. Furthermore, it was held in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), by the Federal Circuit that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from

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the prior art device. (Also see MPEP 2144.04 (d))

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to increase the size of the exhaust holes of Ogasawara et al from the inner most concentric row to the outer most concentric row as taught by Takagi et al, and to optimize the size of the holes.

11. Claims 31 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogasawara et al, WO 02/39493, and Takagi et al, US Patent 6,402,847 B1, as applied to claims 29, 30, 34-37 and 41 above, and further in view of Komiya et al, WO 01/48790.

Ogasawara et al and Takagi et al differ from the present invention in that they do not teach that the thickness of the exhaust ring vary from the inner periphery to the outer periphery.

Komiya et al teaches varying the thickness of the exhaust ring and size of the exhaust holes to control the flow of the exhaust gases through the exhaust ring. (Entire document, specifically, page 13 lines 8-16)

The motivation for varying the thickness of the exhaust ring concentrically in degrees in accordance with the opening area of the exhaust holes of Ogasawara et al and Takagi et al is to optimize the flow through the different area exhaust holes by increasing the thickness of the exhaust ring as taught by Komiya et al.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the thickness of the exhaust ring of Ogasawara et al and Takagi et al as taught by Komiya et al.

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12. Claims 32, 33, 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogasawara et al, WO 02/39493, and Takagi et al, US Patent 6,402,847 B1, as applied to claims 29, 30, 34-37 and 41 above, and further in view of Ishii, JP 2001-093699, and Loewenhardt et al, US Patent 6,030,486.

Ogasawara et al and Takagi et al differ from the present invention in that they do not teach a plurality of magnets arranged around the periphery of the exhaust ring.

Ishii teaches using a plurality of magnets around the periphery of the exhaust ring to prevent plasma leaking (abstract and figures).

Loewenhardt et al teaches the use of magnets 60, 62 with an exhaust ring 96 to prevent the plasma from leaking through the exhaust ring (figures 6 and 7).

The motivation for adding magnets to the exhaust ring of Ogasawara et al and Takagi et al is to prevent plasma from leaking through the exhaust ring as taught by Ishii and Loewenhardt et al.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add a plurality of magnets to the apparatus of Ogasawara et al and Takagi et al as taught by Ishii and Loewenhardt et al.

Response to Arguments

13. Applicant's arguments with respect to claims 29-41 have been considered but are moot in view of the new grounds of rejection.

14. Applicant's arguments filed April 12, 2007 have been fully considered but they are not persuasive.

In regard to the argument:

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Thus, Takagi et al does not disclose a plurality of exhaust holes that extend linearly (i.e., not tapered) as now required by independent Claims 29 and 36.

The Examiner disagrees. Linearly does not mean, "not tapered". Linear given its broadest interpretation means a "resembling a line" or straight. A line can be tapered. Turning to figures 13-20, 23B, 24C, 24D, 26 and 27, it can be seen that figures 13-18, 23B, 24C, and 24D all are linear. Figures 19, 26, and 27 have multiple linear parts, but the total is still linear. Figure 20 has curved surface and thus is not linear. Therefore, the tapered slots of Takagi et al are linear.

In regard to the argument:

Moreover, there is no indication in Takagi et al. that the size of the baffle plate through holes vary according to radial position on the baffle plate. Therefore, Takagi et al. also does not disclose that the plurality of exhaust holes which extend linearly are concentrically arranged in three rows, and the rows are different in opening area of the exhaust hole from each other such that the opening areas of the exhaust holes gradually increase from the inner peripheral side of the exhaust ring toward the outer peripheral side thereof.

The Examiner disagrees. Figure 21 shows 18 slots (181) arranged in three concentric groups arrayed from an inner peripheral side to the outer peripheral side of the exhaust ring 180. The figure 21 clearly shows that the slots are arcs with the same angle of arc (i.e. all begin and end on the same radial line), and the same width. Since the area of the slot is based on the length of the arc and width of the arc; and the length of the arc is a function of the angle of the arc and the radius of the arc; Therefore, because the angle of the arc of the slots 181 is the same and the radius increases from the inner peripheral side to the outer peripheral side, the length of the arc and thus the area of the slot increases from the inner peripheral side to the outer peripheral side, as claimed in the present invention.

In regard to the argument:

The cited reference to Komiya et al. (Fig. 12) apparently discloses only circumferential thickness variation and therefore cannot meet the limitations of Claims 31 and 38.

The Examiner disagrees. Komiya et al, as noted above, clearly teaches using the equations for virtually determining the diameters of the baffle holes and the thickness variation of the baffle plate to determine the circumferentially uniform flow rates. Thus, one of ordinary skill in the art reading Komiya et al would be able through routine experimentation calculate the optimal hole diameter and plate thickness (radially or circumferentially) to optimize the flow through the baffle plate.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-

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1437. The examiner can normally be reached on Monday-Thursday (10:00 am - 9:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jeffrie R. Lund
Primary Examiner
Art Unit 1763

JRL
7/8/07